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with lachnosteria.



Compliments of
C.V. Riley.
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ON THE DIFFICULTY OF DEALING WITH
LACHNOSTERNA.

BY PROF. C. V. RILEY.

Mr. Smith's studies, supplementing as they did Dr. Horn's, had resulted in the separation of the old form *fusca* into several species, which appeared more or less in succession, so that for a considerable period one or another species would be

present. I have recently been much interested in the attacks of these beetles on certain large trees, between thirty and forty feet high, which I transplanted last February to my new home, Sunbury, on Washington Heights. The trees specially attacked were a swamp oak and a chestnut, both of these trees being on the west of my residence. It so happens that the ground on the east was largely filled-in or made ground, while that on the west was, on the contrary, simply leveled off. This proved to be badly infested with *Lachnosterna*, and I have had great difficulty in preventing the entire defoliation of the two trees mentioned. The first species to appear was *L. hirticula*, and this was by far the most abundant and injurious species—the only other species noticed being *fusca*. It was evident from the beginning that the trees in question could not withstand the combined check resulting from the transplanting and the defoliation by the insects, so that I made strenuous efforts to thwart the latter. Smudges would doubtless have been efficacious if they could have been employed, but they were rendered impracticable owing, first, to the height of the trees and then to the prevalence of winds. With the assistance of Mr. Marlatt I made various experiments with insecticides, the chief of which were as follows:

(1) The trees were sprayed with a strong whale oil and tobacco soap solution about five o'clock in the evening. The spraying was satisfactorily and thoroughly done by means of the bamboo extension rod. A rain which followed during the night somewhat interfered with the experiment, but not until after the beetles had appeared and cut off a quantity of the leaves—showing the practical inutility of the application.

(2) London purple was applied at the rate of one pound to one hundred and twenty-five gallons of water, a stronger mixture not being advisable, owing to the tender character of the foliage, especially of the oak. This application was also satisfactorily and thoroughly made, not a leaf having escaped the spraying. There is no doubt but that this spraying resulted in the destroying of a considerable number of beetles, since two dead ones were found under the oak tree next day. It did not, however, limit the onslaught, and I made up my mind that it would be futile to endeavor to prevent the attacks of the beetle by any insecticide or other means at command, for the simple reason that the beetles would escape nightly from the soil, swarming more or less numerous around these two trees.

(3) I also endeavored to attract the beetles by lamps floating in a tub of water having a scum of kerosene. The num-

ber so attracted was so few in comparison with those that swarmed to the trees, that I have been led to reverse my opinion as to the value of this mode of destroying the beetles.

The experience has a certain value, and I would draw the following conclusions from it :

First. That it is impossible to protect large and tall trees from these beetles, when, as in this instance, these are issuing in large quantities from the ground immediately under and around the trees.

Secondly. It confirms the fact that these insects, as do so many other species, show a predilection for newly transplanted trees, in which the growth is less vigorous and the foliage more tender than it is in healthy forest trees.

Thirdly. My place is well isolated from other forest trees, the nearest woods being nearly half a mile away, with no other cultivated trees of consequence in the immediate vicinity. It occurred to me, therefore, that my trees suffered from a concentration of the beetles from other parts of the neighborhood on to these isolated trees, but I became convinced that such was not the case, but that they all came from the ground in the immediate vicinity. This conclusion was emphasized by the fact that another large oak not two hundred feet away, but on the east side of the house, and in ground from which no beetles issued, was scarcely touched. The practical inference is that if we can keep the ground in the immediate vicinity of our trees free from the larvæ, little injury will be suffered from the beetles.

The injury was not done through devouring of the leaves, but almost entirely through the gnawing of the petiole near the base or junction with the twig, the ground being covered each morning with fresh leaves, 95 per cent. of which had hardly been eaten at all. This preference for the gnawing of the petiole is, so far as I am aware, a new experience, and may be one of the habits peculiar to *hirticula*. It is an interesting point, which, I regret, time did not permit me to solve satisfactorily, whether the same beetles re-enter the ground and re-visit the tree day after day, or whether, on the contrary, they are short-lived, and, after their first nocturnal havoc, pair and re-enter the ground only to propagate. The appearance of fresh holes daily would indicate the latter alternative, and I am inclined to believe that the injury was done by a succession of beetles, and also by a succession of species, as it continued for the period of nearly a month, gradually diminishing, however, and being worst during the first few nights and especially in warm and calm weather.



